

REMARKS/ARGUMENTS

Applicants thank the Examiner for the thorough examination to date. Applicants have herein amended independent Claims 1, 3, and 5 in order to more clearly define the present invention and remove any ambiguity that may have existed as relates to the multifunction electromagnetic coil being a single coil supplying both AC and DC components. This clarification has been accomplished by incorporating the limitations of Claims 2, 4, and 6 into their respective independent Claims 1, 3, and 5. To further avoid any such ambiguity that the single coil carries both AC and DC components, Claims 10, 11, and 12 have been canceled in their entirety. However, Applicants point out that deleting these claims should not negate the fact that the present inventive apparatus may of course be replicated in its entirety in situations where a large work piece is intended to undergo electromagnetic treatment. Non-elected Claims 7, 8, and 9 have previously been deleted. Applicants continue to reserve the right to file Divisional applications on the non-elected subject matter. Independent Claims 1, 3, and 5 remain as the sole pending claims in the present application.

Double Patenting Rejection

The Examiner has provisionally rejected Claims 1-6 of the instant application on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-3 of copending application serial number 10/498,239 (hereinafter copending application '239). Applicants have provided herewith a Terminal Disclaimer to thereby overcome the double-patenting rejection.

Rejection of Claims 1-6 and 10-12 under 35 USC § 103(a) based on Vives in view of either Mucha et al. or Simcock

The Examiner has rejected Claims 1-6 and 10-12 in view of Vives (U.S. Patent No. RE32,529) in view, alternatively, of either Mucha et al. (U.S. Patent No. 4,897,518) or Simcock (U.S. Patent No. 4,927,460). Applicants respectfully disagree.

Applicants' arguments made within the Response and Amendment filed on December 20, 2006 are believed to be equally applicable to the present Final Office Action. Such arguments are therefore herein incorporated by reference, but for the sake of clarity not completely duplicated verbatim herein.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art whereby: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references must teach or suggest all of the claim limitations. Applicants respectfully submit that the outstanding rejection fails to meet these requirements of prima facie obviousness.

The primary reference to Vives fails to show or fairly suggest using only a single electromagnetic coil. As well, the operational complexities as seen in Vives would require two related power supplies corresponding to the two separate (stationary and variable) coils. Neither the Mucha et al. nor Simcock references provide any motivation or suggestion whatsoever to modify the apparatus of Vives so as to arrive at Applicants' claimed invention. Applicants submit that the Mucha et al. reference is a method of monitoring an induction heating cycle that applies to induction heating systems for the heat treatment of iron or steel or other alloys for components like camshafts and the Simcock reference is directed to a method and apparatus for providing agitation of the melt in the induction melting of metals. Neither Mucha et al. nor Simcock show or fairly suggest the single multifunction coil as claimed in instant Claims 1, 3, and 5 which are the sole pending claims remaining in the instant application. Even if combined with the Vives reference, these secondary references fail to remove the defects discussed above that render the Vives reference inapplicable to the instant claims. Accordingly, the combination of Vives with either Mucha et al. or Simcock fails to show or fairly suggest the present invention as claimed.

More specifically, Applicants respectfully submit that the instant invention as claimed is both structurally and functionally different from the cited art alone or in any combination. The present invention requires a single electromagnetic coil. The integrated Electromagnetic Stirring and Vibration (IESV) invention utilizes only ONE single electromagnetic coil. Such coil

is wound from only ONE conductor. The coil only has two electrical connectors (at the beginning and at the end of the conductor) linked to the Controlled Current/Voltage Power Source (CCVP). In practical terms, windings for the present invention are hot impregnated into ONE single electromagnetic coil with outer and inner diameters specifically designed to accommodate the crucible for holding the liquid/semi-solid/solid work piece. This is in sharp contrast to all other cited art that requires TWO separate coils and TWO independent power supplies (one for the AC current, and one for the DC current).

Applicants further submit that the cited art fails to show or fairly suggest the novel single power supply that performs generation of an Alternative Current (AC) component having harmonic shapes, imposes a Direct Current (DC) component with constant bias on the AC component, and varies the frequency of the AC component. This limitation was previously clear within Claims 2, 4, and 6, and such limitation is now explicitly claimed within independent Claims 1, 3, and 5.

Applicant submits that the novel approach of the present invention including ONE single coil powered by ONE single power supply is highly desirable in practice. As one example, liquid melt treatment by a combined application of stirring (AC) and vibration (DC) forces that modify the liquid and subsequently the solid metal and alloy characteristics enables -- through the present novel invention -- a melt treatment that can be carried out exclusively in a liquid state without involving a semi-solid operation. Applicants respectfully submit that such example cannot be accomplished via the cited art, nor is such shown or fairly suggested by the cited art alone or in any combination.

Applicants therefore respectfully submit that the above discussion militates in favor of the present invention for its non-obviousness. Accordingly, the rejection under §103 (a) should be withdrawn.

Conclusion

Applicants respectfully submit that Claims 1, 3, and 5 are not shown or fairly suggested by the cited references taken alone or in any combination. Accordingly, the outstanding rejections should be withdrawn. No additional fee beyond the statutory disclaimer fee of \$65.00 for a

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small entity is believed due for this submission. However, Applicant authorizes the Commissioner to debit any other required fee from Deposit Account No. 503807, in the name of Dennis R. Haszko. The Commissioner is further authorized to debit any additional amount required, and to credit any overpayment to the above-noted deposit account.

Applicant has amended the claims of this application so that they are proper, definite, and define novel structure which is also non-obvious. If, for any reason this application is not believed to be in full condition for allowance, Applicant respectfully requests that the Examiner contact the undersigned representative at (207) 615-0424 and hereby solicits the constructive assistance and suggestions of the Examiner pursuant to MPEP § 2173.02 in order that the undersigned can place this application in allowable conditions as soon as possible and without the need for further proceedings and related cost to the Applicants.

It is submitted that this application is now in condition for allowance, and action to that end is respectfully requested.

Respectfully submitted,

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